WHAT IS CLAIMED IS:

1. A method for detecting shock absorber damage, comprising:

detecting wheel speed signals of an antilock braking system rotational wheel speed sensor; and

determining a condition of said shock absorber by analyzing said wheel speed signals.

2. The method according to Claim 1, wherein the step of analyzing said wheel speed signals includes one of determining a temporal course of a radius change Δr of a vehicle tire, and determining a temporal course of a rotational speed change Δn of a wheel rim, based on said wheel speed signals.

3. The method according to Claim 2, further comprising computing at least one of an auto power density spectrum $\Phi_{\Delta r}$ for the temporal course of the radius change Δr, and an auto power density spectrum $\Phi_{\Delta n}$ for the temporal course of the rotational speed change Δn.

4. The method according to Claim 3, further comprising computing a quotient $DSKW_{\Delta r}$ or $DSKW_{\Delta n}$ from the auto power density spectra for first and second frequency ranges, the computed

quotient corresponding to a characteristic shock absorber damage value.

5. The method according to Claim 4, wherein the quotient $DSKW_{\Delta r}$ or $DSKW_{\Delta n}$ is computed according to one of the two equations

$$\mathrm{DSKW}_{\Delta r} = \sum_{i=1}^{k} \frac{\Phi_{\Delta r}(\omega_{1,i}, d)}{\Phi_{\Delta r}(\omega_{2,i})} \cdot \left(\frac{\omega_{1,i}}{\omega_{2,i}} \right)^{w}$$

$$\mathrm{DSKW}_{\Delta n} = \sum_{i=1}^{k} \frac{\Phi_{\Delta n}(\omega_{1,i}, d)}{\Phi_{\Delta n}(\omega_{2,i})} \cdot \left(\frac{\omega_{1,i}}{\omega_{2,i}} \right)^{w}$$

wherein

$\omega_{1,i}$ = discrete frequency values of the first frequency range,

$\omega_{2,i}$ = discrete frequency values of the second frequency range,

w = bumpiness, preferably approximately 2, and

k: = number of discrete frequency points.

6. The method according to Claim 4, wherein the first frequency range corresponds to an analysis interval and the second frequency range corresponds to a reference interval.

7. The method according to Claim 4, wherein the second frequency range has higher frequencies than the first frequency range.

8. The method according to Claim 4, wherein the first frequency range has frequencies $\omega_{1,i}$ of approximately 12 to 15 Hz and/or the second frequency range has frequencies $\omega_{2,i}$ of approximately 19 to 22 Hz or approximately 30 to 33 Hz.

9. The method according to Claim 1, further comprising high-pass filtering of the wheel speed signal.

10. The method according to Claim 3, further comprising:

computing a quotient $DSKW'_{\Delta r}$ or $DSKW'_{\Delta n}$ from a quotient of the auto power density spectrum for first and second frequency ranges, and a quotient of the auto power density spectrum for the second frequency range and third frequency range, the computed quotient $DSKW'_{\Delta r}$ or $DSKW'_{\Delta n}$ corresponding to a characteristic shock absorber damage value.

11. The method according to Claim 10, wherein the quotient $DSKW'_{\Delta r}$ or $DSKW'_{\Delta n}$ is computed according to one of the two equations

$$\mathrm{DSKW'}_{\Delta r} = \sum_{i=1}^{k} \left(\frac{\dfrac{\Phi_{\Delta r}(\omega_{1,i}, d)}{\Phi_{\Delta r}(\omega_{2,i})}}{\dfrac{\Phi_{\Delta r}(\omega_{2,i})}{\Phi_{\Delta r}(\omega_{3,i})}} \right)$$

$$\mathrm{DSKW'}_{\Delta n} = \sum_{i=1}^{k} \left(\frac{\dfrac{\Phi_{\Delta n}(\omega_{1,i}, d)}{\Phi_{\Delta n}(\omega_{2,i})}}{\dfrac{\Phi_{\Delta n}(\omega_{2,i})}{\Phi_{\Delta n}(\omega_{3,i})}} \right)$$

wherein

$\omega_{1,i}$ = discrete frequency values of the first frequency range,

$\omega_{2,i}$ = discrete frequency values of the second frequency range,

$\omega_{3,i}$ = discrete frequency values of the third frequency range,

and

k = number of discrete frequency points.

12. The method according to Claim 10, wherein the first frequency range corresponds to an analysis interval, the second frequency range corresponds to a first reference interval, and the third frequency range corresponds to a second reference interval.

13. The method according to Claim 10, wherein the second frequency range has higher frequencies than the first frequency range, and the third frequency range has higher frequencies than the second frequency range.

14. The method according to Claim 10, wherein at least one of the following is true:

the first frequency range has frequencies $\omega_{1,i}$ of approximately 12 to 15 Hz;

the second frequency range has frequencies $\omega_{2,i}$ of approximately 19 to 22 Hz; and

the third frequency range has frequencies $\omega_{3,i}$ of approximately 30 to 33 Hz.

15. The method according to Claim 4, further comprising:

correcting the characteristic shock absorber damage value by means of at least one driving condition signal.

16. The method according to Claim 15, wherein the driving condition signal is selected from the group consisting of driving speed, throttle valve angle, torque, rotational engine speed, gear position, operating condition of a converter clutch and position of a clutch switch group.

17. The method according to Claim 4, further comprising:

comparing the characteristic shock absorber damage value with a threshold value to determine shock absorber condition.

18. The method according to Claim 17, wherein shock absorber damage is present when the characteristic shock absorber damage value exceeds the threshold value.

19. Apparatus for detecting shock absorber damage, comprising a processing unit for determining characteristics of a shock absorber by analyzing wheel speed signals of an antilock system rotational wheel speed sensor.

20. The apparatus according to Claim 19, wherein said processing unit includes a component for determining one of a temporal sequence of a radius change Δr of a vehicle tire, and a temporal course of a rotational speed change Δn of a wheel rim, based on said wheel speed signals.

21. The apparatus according to Claim 20, wherein said processing unit comprises a component for computing at least one of an auto power density spectrum $\Phi_{\Delta r}$ for the temporal course of the radius change Δr, and an auto power density spectrum $\Phi_{\Delta n}$ for the temporal course of the rotational speed change Δn.

22. The apparatus according to Claim 21, wherein said processing unit further comprises a component for computing a quotient $DSKW_{\Delta r}$ or $DSKW_{\Delta n}$ from the auto power density spectra for first and second frequency ranges, the computed quotient corresponding to a characteristic shock absorber damage value.

23. The apparatus according to Claim 22, wherein the quotient $DSKW_{\Delta r}$ or $DSKW_{\Delta n}$ is computed according to one of the two equations

$$\mathrm{DSKW}_{\Delta r} = \sum_{i=1}^{k} \frac{\Phi_{\Delta r}(\omega_{1,i}, d)}{\Phi_{\Delta r}(\omega_{2,i})} \cdot \left(\frac{\omega_{1,i}}{\omega_{2,i}} \right)^{w}$$

$$\mathrm{DSKW}_{\Delta n} = \sum_{i=1}^{k} \frac{\Phi_{\Delta n}(\omega_{1,i}, d)}{\Phi_{\Delta n}(\omega_{2,i})} \cdot \left(\frac{\omega_{1,i}}{\omega_{2,i}} \right)^{w}$$

wherein

$\omega_{1,i}$ = discrete frequency values of the first frequency range,

$\omega_{2,i}$ = discrete frequency values of the second frequency range,

w = bumpiness, preferably approximately 2, and

k: = number of discrete frequency points.

24. The apparatus according to Claim 21, wherein said processing unit further comprises a component for computing a quotient $\mathrm{DSKW'}_{\Delta r}$ or $\mathrm{DSKW'}_{\Delta n}$ from a quotient of the auto power density spectra for first and second frequency ranges, and a quotient of the auto power density spectrum for the second frequency range and a third frequency range, the computed quotient $\mathrm{DSKW'}_{\Delta r}$ or $\mathrm{DSKW'}_{\Delta n}$ corresponding to a characteristic shock absorber damage value.

25. The apparatus according to Claim 24, wherein the quotient $DSKW'_{\Delta r}$ or $DSKW'_{\Delta n}$ is computed according to one of the two equations

$$\mathrm{DSKW'}_{\Delta r} = \sum_{i=1}^{k} \left(\frac{\dfrac{\Phi_{\Delta r}(\omega_{1,i}, d)}{\Phi_{\Delta r}(\omega_{2,i})}}{\dfrac{\Phi_{\Delta r}(\omega_{2,i})}{\Phi_{\Delta r}(\omega_{3,i})}} \right)$$

$$\mathrm{DSKW'}_{\Delta n} = \sum_{i=1}^{k} \left(\frac{\dfrac{\Phi_{\Delta n}(\omega_{1,i}, d)}{\Phi_{\Delta n}(\omega_{2,i})}}{\dfrac{\Phi_{\Delta n}(\omega_{2,i})}{\Phi_{\Delta n}(\omega_{3,i})}} \right)$$

wherein

$\omega_{1,i}$ = discrete frequency values of the first frequency range,

$\omega_{2,i}$ = discrete frequency values of the second frequency range,

$\omega_{3,i}$ = discrete frequency values of the third frequency range,

and

k = number of discrete frequency points.

26. The apparatus according to Claim 22, wherein said processing unit further comprises a correction component for correcting characteristic shock absorber damage value by means of at least one driving condition signal.

27. The apparatus according to Claim 26, wherein the driving condition signal is selected from the group consisting of driving speed, throttle valve angle, torque, rotational engine speed,

gear position, operating condition of a converter clutch, and position of a clutch switch group.

28. The apparatus according to Claim 22, wherein said processing unit further comprises a component for comparing the characteristic shock absorber damage value with a threshold value to determine shock absorber condition.

29. The apparatus according to Claim 28, wherein shock absorber damage is present as soon as the characteristic shock absorber value exceeds the threshold value.